

Station Uprate Operational Guidance Manual

D. Isophase Bus Cooling

Project Overview

The isolated phase bus duct was originally designed to operate at a maximum of 23,100 amperes at 26 kV or approximately 1040 MVA. This rating provided significant thermal and electrical margin because the generator was originally operated at 880 MVA (840 MW @ >.95 power factor). Even with the generator output increased to 990 MVA (950 MW @ >.96 power factor) the isolated phase bus is still within original design current limits.

However our operating experience with the isolated phase bus at both 840 and 875 MW indicated the bus is operating at higher than design temperatures. The bus was supposed to have been designed so the maximum operating temperature of the enclosure did not exceed 80 C and the temperature of the conductor did not exceed 100 C. We have measured temperatures in excess of 110 C on the generator terminal enclosure and we have had problems with the oxide inhibiting grease on the conductor terminal hardening because of high temperature. Using irreversible temperature strips we have measured temperatures in excess of 160 C on the generator terminals.

In order to resolve concerns about the bus operating temperatures and provide additional thermal and electrical margin we had the bus manufacturer, Delta-Unibus perform an up rate study. Based on the results of the uprate study they are recommended we install a forced cooling system at the generator terminal.

Initial Startup Issues

None expected.

Operational Guidelines

The cooling system is designed to draw air from the building, filter the air and then blow the air from the generator terminal to the generator breaker and from the generator breaker to the transformer. The fan unit will be powered by a 15 HP 3ph 460v motor and will provide 10,000 cfm of total cooling air. The fan unit will be belt driven by one motor and a spare motor will be installed but not connected. If the operating motor fails it will be necessary to install belts on the spare motor.